<u>REMARKS/ARGUMENTS</u>

Reconsideration and re-examination are hereby requested.

Applicant wishes to make a record a telephone interview held on September 19, 2006 between Examiner Hoffmann and Applicant's attorney Richard Sharkansky. Also present were: Attorney Mandel Slater Reg. No. 26,235, the inventors Thomas M. Hartnett and Joseph M. Wahl and Dr. Suri Sastri, CEO Surmet Corporation, Burlington, MA. The Maguire patent (USP 4686070) and Claim 36 were discussed. No agreement was reached.

The Applicants wish to make the following comments on the Examiner's Summary. First, Applicants pointed out in the interview that the patent application describes both a batch and continuous process. Applicants also pointed out that in *In re Dilnot,* one must first determine the prior art process and then determine whether applicant merely adds material continuously to the prior art process. It was pointed out that the prior art process of Maguire <u>does not</u> produce ALON by **adding nitrogen while mixing the powders at a constant temperature but rather the prior art first formed AlN at one temperature and then converted the formed AlN to AlON at a second temperature**. **<u>The Examiner did state that he would consider amendments to the claims which pointed out the particles, rather than the furnace, were subjected to constant temperature.</u>**

With regard to the rejection under 35 USC 103:

In accordance with the invention, <u>Applicants have recognized that one can more rapidly produce ALON</u> **<u>in one step</u>** <u>with a process by having a sufficient temperature and adding nitrogen while mixing the powders at such temperature.</u>

With regard to Maguire, reference is made to column 2, beginning at line 36:

> ... a substantially homogeneous cubic aluminum oxynitride powder by reacting gamma aluminum oxide with carbon in a nitrogen atmosphere. More specifically, aluminum oxide (alumina) and carbon black are dry mixed, for instance, in a Patterson-Kelly twin-shell blender for times up to two hours. Preferably, the aluminum oxide has a purity of at least 99.98% and an average particle size of 0.06 microns, and the carbon black has a purity of no less than 97.6% with 2.4% volatile content

> and an average particle size of 0.027 microns. The carbon content of the mixture can range from 5.4 to 7.1 weight percent. A preferred mixture comprises 5.6 weight percent carbon black and 94.4 weight percent aluminum oxide. The ***aluminum oxide/carbon mixture is placed in an alumina crucible*** and is reacted in an atmosphere of flowing nitrogen at temperatures from 1550°C to 1850°C. for up to two hours at the maximum temperature. **The preferred heat treatment is in *two steps*. *In the first step,* a temperature of approximately 1550° C. is used for approximately one hour, whereby, for an appropriate ratio of alumina to carbon, the temperature unstable gamma-aluminum oxide is only partially reacted with carbon and nitrogen to form both alpha-aluminum oxide and aluminum nitride.** A one hour soak at 1550°C. is sufficient to convert the proper amount of Al_2O_3 to AlN. ***In the second step***, a temperature of 1750°C. or up to the solidus temperature of aluminum oxynitride (2140°C.), is used for approximately 40 minutes, whereby alpha-aluminum oxide and aluminum nitride combine to form cubic aluminum oxynitride.

The Background of the Invention section (AAPA) **does not describe producing ALON with a one-step process;** rather as described therein first aluminum nitride is produced (equation (1), and then the produced aluminum nitride is reacted with a proper amount of alumina to produce ALON (equation (2). Thus, the process described in the AAPA first forms aluminum nitride and then uses the formed aluminum nitride to form aluminum oxynitride. The process is described in more detail in Maguire. Neither Maguire nor AAPA describe producing ALON by having a sufficient temperature and adding nitrogen while mixing the powders at such temperature.

The Examiner has taken the position that for a continuous process the temperature (while the Examiner states "pressure", it is assumed that the Examiner means "temperature") **must be constant.** It is first noted that the only claims that deal with either continuously introducing material or continuously removing material are claims 36, 44, 47, 50, 53, 54, 64, 72 and 80. Next it is noted that neither Maguire et al nor AAPA describe or suggest or recognize that ALON can be produced by **having a sufficient temperature and adding nitrogen while mixing the powders at such temperature.** No one has previously suggested how to do this, certainly not the authors of the applied references. To suggest otherwise is to fall into the trap of reconstructing the invention in

effect relying on hindsight based on the Applicants' own disclosure, which is impermissible. Specifically, one must initially put out of mind what the Applicants did and look only at the scope and content of the prior art as it existed before their invention and consider what it suggested. Maguire et al knew they could make aluminum nitride from aluminum oxide and carbon and later process it to convert the aluminum oxide and aluminum nitride mixture to form ALON, but they did not know how to do it in a continuous process. Apparently, since 1987, when Maguire et al issued, no one else has accomplished this, but the inventors in the present application have discovered how to do it. This is their contribution to the art, and the utter simplicity of it does not negate patentability; in fact it is their discovery of a most useful, simplified process that is a significant advance in the art and that deserves the award of Letters Patent of the United States. In any event, nothing in the prior art discussed above describes or suggests that one can produce ALON in a single step by having a sufficient temperature and adding nitrogen while mixing the powders at such temperature.

The Examiner cites IN RE SIDNEY DILNOT United States Court of Customs and Patent Appeal *50 C.C.P.A. 1446; 319 F.2d 188; 196.* The Examiner states:

> **From MPEP 2144.04**
> E. Making Continuous
> In re Dilnot, 319 F.2d **188, 138 USPQ 248** (CCPA 1963) (Claim directed to a method of producing a cementitious structure wherein a stable air foam is introduced into a slurry of cementitious material ***differed** from the prior art **only** in requiring the addition of the foam to be continuous*. The court held the claimed continuous operation would have been obvious in light of the batch process of the prior art.). (Emphasis ours)

The CCPA in such case stated:

> Upon reconsideration, the board answered that contention as follows:
>
> * * * Although appellant urges claim 22 to be drawn to a continuous process, the limitation "continuously introducing said foam" relates to foam introduction, ***the remainder of the claimed process apparently reading on a batch process***. (Emphases ours)

From In re Dilnot, (copy attached) it seems that the inventor there did nothing other than run the prior art process on a continuous basis without changing any other parameter. This is not the case with *the present invention which **differs** from (i.e., proceeds contrary to)* ***THE PRIOR ART PROCESSES*** as taught by Maguire and the AAPA since the ***NONE OF THE PRIOR ART PROCESSES*** as taught be Maguire and the AAPA ***involve or suggest the steps emphasized below*** for each of the independent claims set forth below:

Claim 32:

reacting the aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles; and

subjecting the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles to a temperature sufficient to convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride during the entire conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride;.

Claim 34:

reacting the aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles;

subjecting the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles to a constant temperature during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 36:

reacting aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles;

subjecting the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles to at a constant temperature during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 38:

reacting the aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles with the chamber; and

providing a temperature about 1700-1900°C during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 39: reacting the aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles;

having the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles at a temperature selected to convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 41:

reacting aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber,

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles with the chamber; and

having the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles at a temperature maintained and sufficient to convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride during the conversion process.

Claim 47:

reacting aluminum oxide particles and carbon particles continuously introduced into the provided chamber with nitrogen, comprising:

continuously mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles;

subjecting the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles to a temperature to continuously convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride and wherein said the temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles is maintained during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 53:

reacting aluminum oxide particles and carbon particles continuously introduced into the provided chamber with nitrogen, comprising:

continuously mixing and heating the provided chamber with the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles; and

wherein heating of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles is maintained to convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride and wherein said the temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles is maintained during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 54:

reacting aluminum oxide particles and carbon particles continuously introduced into the provided chamber with nitrogen, comprising:

heating the provided chamber;

continuously mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles; and

including heating of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles to continuously convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride and wherein said the temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles is maintained during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 58:

mixing the aluminum oxide particles and carbon particles within the chamber while passing nitrogen gas over the aluminum oxide particles and carbon particles during the mixing with the temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles being maintained constant during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 60:

mixing the aluminum oxide particles and carbon particles while passing nitrogen gas thereover at a temperature sufficient to form the aluminum oxynitride, and (d) removing said aluminum oxynitride from the chamber.

Claim 76:

mixing the aluminum oxide particles and carbon particles within the chamber while passing nitrogen gas over the aluminum oxide particles and carbon particles during the mixing with the temperature of the aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles being maintained sufficient during the entire conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

THUS, FROM *IN RE DILNOT,* ONE MUST FIRST DETERMINE THE PRIOR ART PROCESS AND DETERMINE WHETHER WHAT APPLICANT IS DOING IS MERELY ADDING MATERIAL CONTINUOUSLY TO THE PRIOR ART PROCESS. THE STEPS SET FORTH IN THE CLAIMS DISCUSSED IN THE LAST PARAGRAPH <u>*ARE NOT*</u> THE PRIOR ART PROCESS OF MAGUIRE OR THE AAPA. ***Therefore, In Re Dilnot is not applicable to the facts in this case.***

The present inventions recognized that one can produce ALON ***by having a sufficient temperature and adding nitrogen while mixing the powders at such temperature***. Here, considering for example claim 58, such claim points out that the method includes mixing the aluminum oxide particles and carbon particles within the chamber while passing nitrogen gas over the aluminum oxide particles and carbon particles during the mixing with the temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles being maintained constant during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride. Mixing aluminum oxide particles and carbon particles within the chamber while passing nitrogen gas over the aluminum oxide particles and carbon particles during the mixing with the temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles maintained constant during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride ***differs*** from the process of Maguire and the AAPA and ***is not recognized or suggested in the prior art process*** of Maguire or AAPA.

With regard to the Claim Objection:

With regard to the requirement for indentations in several of the claims, the Examiner cites From **MPEP 608.01 Form of Claims**

> Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation, 37 CFR 1.75(i).

First such claims do not set forth a plurality of steps. And, second, the provision does not appear to be required or mandatory but merely is in the form of a suggestion. Reconsideration is respectfully requested.

With regard to the Rejection Under 35 USC 112:

No reason has been given for the rejection. Previous rejections under 35 USC 112 have been addressed.

In the event any additional fee is required, please charge such amount to Patent and Trademark Office Deposit Account No. 50-3192.

Respectfully submitted,

October 12, 2006
Date

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